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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,275	01/20/2004	Yasutaka Sakata	Q79227	6854

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WASHINGTON, DC 20037

EXAMINER
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DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/759,275

Applicant(s)

SAKATA, YASUTAKA

Examiner

Jennifer M. Dolan

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 5-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/721,662.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/20/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/721,662, filed on November 27, 2000.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 5-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 5, it is unclear what is intended by claiming “setting heights which provide an identical coupling coefficient independently of the oscillation wavelength (lines 8-9)”, since the coupling coefficient is, by definition, dependent upon the lasing wavelength. It is assumed that the applicant intends to claim “setting heights which provide an identical coupling coefficient for each laser of the plurality of semiconductor lasers.”

It is further unclear in claim 5 what is meant by forming an active layer “by” forming an electrode (lines 13-16), since the formation of an active layer for a DBR laser involves deposition of semiconductor quantum wells rather than deposition of electrode materials. For the purpose of examination, it is assumed that “by” is replaced by --; and--.

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Regarding claims 6 and 8, relative terms, such as “larger” and “smaller” are used without establishing a basis for comparison of these relative quantities. It is also unclear as to whether the grating has a “larger height” or is “unchanged”. For the purposes of examination, it is assumed that for some lasers in the plurality of laser devices, the height of the diffraction grating is larger than other lasers in the plurality of laser devices, in order to increase the coupling coefficient.

Regarding claim 9, the claim recites the limitation “the selective MOVPE growth.” There is insufficient antecedent basis for this limitation in the claims.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 5 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,953,359 to Yamaguchi et al (cited by applicant).

Regarding claim 5, Yamaguchi discloses a process for producing an optical semiconductor device comprising a plurality of semiconductor lasers (12(1)-12(n)) which oscillate longitudinal single mode laser beams with different wavelengths (column 9, lines 15-40), and are simultaneously formed on a single substrate (1; figures 1-3), comprising the steps of: coating a resist on the substrate and exposing the resist to a pattern (column 9, lines 45-52; the disclosed standard photolithography is taken as by definition including coating and exposing a

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resist to form a pattern) of a plurality of diffraction gratings for setting pitches (column 9, lines 54-65) and setting heights (all of the gratings are set to have an identical height) to provide an identical coupling coefficient for each of the plurality of lasers (see figure 14; column 11, lines 42-50; column 12, lines 1-16; note that the selection of the pitches, the heights (uniform for each laser in this case), and the active layer materials directly provide uniform lasing output characteristics and gain, and hence, a uniform coupling coefficient); etching the substrate such that the level of etching per time unit is identical (all gratings are etched in the same step under the same conditions); patterning a mask (3(1)-3(n); column 9, line 64 – column 10, line 35) to give a predetermined shape according to the arrangement of the diffraction gratings (column 10, lines 9-24); forming a laser active layer (4, 5, 6, and 7) on the gratings using the mask (figures 3B, 3C), and forming electrodes (9, 10) on the top surface of the laser active layer (figure 3D) and on the backside of the substrate (figure 3E).

Regarding claim 9, Yamaguchi discloses that the patterning step involves patterning an electro-absorption optical modulator (region 'B'; see figures 9-12) coupled to the lasers ('region A'); and selective MOVPE growth is used for forming an absorption layer in the modulator (column 15, line 58 – column 16, line 16; column 17, lines 1-47).

***Allowable Subject Matter***

6. Claims 6-8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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7. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 6, the primary reason for allowability is the requirement that different grating heights are used for the lasers having different emission wavelengths, such that the coupling coefficient is the same for both lasers. The prior art of record teaches using substantially similar grating heights for lasers with different wavelengths, and varying different quantities, such as grating pitch or active layer material, in order to achieve substantially similar coupling coefficients. Although the prior art shows some recognition of the relationship between the coupling coefficient of the laser and the grating depth (see JP 02-090688 to Yamaguchi), there is insufficient suggestion or motivation to specifically use such a feature in a monolithic, multiple wavelength laser array, and likewise, there is insufficient suggestion in Yamaguchi of how gratings with a different depth could be applied to multiple devices in a monolithic array.

Regarding claims 7 and 8, the primary reason for allowability is that the prior art fails to teach controlling the height of a diffraction grating by varying the opening width of a photoresist window as claimed. Instead, the prior art of record teaches using a photoresist layer not having specific window openings, and altering the grating depth by increasing the etch time. Since the present invention allows for different height gratings to be formed on a single substrate in a single grating etch step as well as greater control of grating depth, whereas the prior art methods require multiple grating etch steps to achieve different height gratings, it is the Examiner's opinion that the claimed features would not have been obvious to a person skilled in the art.

*Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Japanese Patent Publication 02-090688 to Yamaguchi discloses the relationship between the depth of the grating, the coupling coefficient, and the oscillation wavelength.

U.S. Patent No. 5,901,166 to Nitta et al. discloses changing the grating depth or the waveguide materials in two different waveguide branches in order to form similar coupling coefficients for different wavelength modes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

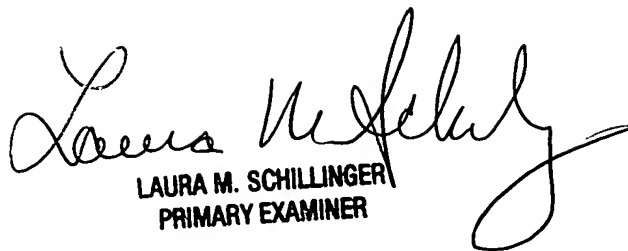
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Jennifer M. Dolan

Examiner

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jmd

  
LAURA M. SCHILLINGER  
PRIMARY EXAMINER